

REMARKS/ARGUMENT

Claims 1-9 and 22-37 are pending in the application. Of these claims, claim 26 is rejected under the provisions of 35 U.S.C. 112 second paragraph and claims 1-9 and 22-37 are rejected under the provisions of 35 U.S.C. 103(a) in view of disclosure in the primary reference US Patent 6,162,702 of Morcom et al. and in the secondary reference US Patents 5,528,080; 6,297,131; 6,358,762 and 5,463,246 of Goldstein, Yamada et al., Kohno et al. and Matsunami respectively.

In response, applicants herein cancel claim 26, amend each of the independent claims pending in the application, claims 1,22 and 31, amend several of the dependent claims and submit remarks of explanation and distinction over the relied upon references. Declarations relating to issues arising in the rejection are also submitted along with changes to improve the language of several claims and acknowledgement of an interview attempt initiated by applicants' undersigned attorney.

Turning first to the 35 U.S.C. 103(a) rejection, the relied upon Morcom et al. '702 patent appears to disclose a ring and rib strengthened, thinned wafer arrangement in which wafer backside material intermediate supporting ring and rib members is removed in order to achieve better thermal and electrical properties for a vertically disposed power semiconductor device. The circular rim 9 of the Morcom wafer is formed with the aid of mask elements 4 and 5 and is connected with wafer spanning ribs 6 and 7 that are disposable in a variety of patterns including the simple cross pattern of FIG. 4, the chord disposed pattern of FIG. 5 and the rectilinear grid pattern of FIG. 6. For present purposes it is significant to note that the Morcom invention, as is indicated in the Office Action, does not include disclosure of wafer thickness-traversing via holes nor does it disclose the use of a metallic ground plane element on the wafer backside. Additionally the Morcom patent does not disclose the presence of via hole diameter-measuring elements nor concern with the combination of structural and electrical elements needed for useful microwave radio frequency properties in the wafer.

With further respect to the Morcom et al. patent and its relevance as a reference in the present proceedings, applicants respectfully question the Office Action page 5 assertion that portions of the Morcom ring and rib structure could perform the function of applicants' vernier marker via hole measuring elements. Applicants' vernier marker via hole measuring elements are via hole diameter measuring elements disposed within the via holes and within the thickness of the semiconductor wafer and include a graduated measurement scale element (all as disclosed in the incorporated by reference U.S. Patent 6,653,214). Nothing in the Morcom ring and rib structure appears capable of achieving the graduated measurement scale element structure nor the function of via hole diameter measuring as is asserted in the Office Action. Moreover the location of the asserted Morcom et al. "measuring" elements is significantly different from the location of applicants' measuring elements. Distinguishing details of applicants' vernier marker are recited in the rejected claims of the application including for example claims 4 and 33. Such details do not appear in the Morcom et al. patent nor in other of the Office Action relied upon references.

Additional points of distinction regarding applicants' claimed invention and the Morcom et al. reference appear in the enclosed declaration of Dr. Gregory DeSalvo, the first listed one of the named inventors of the instant application. These points include comments regarding the microwave radio frequency nature of applicants' semiconductor wafer and the resulting need for the combination of a thin wafer, a ground plane and ground plane-connected low electrical resistance via elements. As emphasized by Dr. DeSalvo the combination of these three elements (thin wafer, ground

plane and ground plane-connected low resistance via elements) is found to be needed for optimum microwave radio frequency performance in the case of applicants' invention.

The absence of low resistance via elements, the absence of a ground plane element and the lack of concern for microwave radio frequency signals in the Morcom et al. patent are respectfully submitted to be of special significance with respect to relevance of the patent as a reference in the present proceedings. These differences in fact suggest the Morcom et al. patent is most fairly concluded to be non-analogous art with respect to applicants' invention and as a teaching away from applicants' invention and as tending to destroy the function of applicants' invention if applied as suggested in the Office Action. The absence of a via hole measuring element in the Morcom et al. patent (and in other references identified in the Office Action) is submitted to be fairly considered as a failure to consider all of the limitations recited in applicants' rejected claims. Each of these conclusions have of course been considered by the courts hearing patent cases as alone being a significant mitigation against an asserted 35 U.S.C. 103(a) rejection. The applicability of several such conclusions in the present instance is respectfully submitted to even further weaken support for the rejection.

The Goldstein et al. '080 patent relied upon in the Office Action appears to disclose a through-wafer electrical conductor arrangement in which an electrically conductive alloy material is migrated part way through a semiconductor wafer by way of a temperature difference migration process that is followed by a wafer thinning step. In the Goldstein et al. invention masking is used to define the location of the migrated alloy conductors on an annealed but otherwise undisturbed wafer surface. The Goldstein et al. alloy is a mixture of for example aluminum and the wafer semiconductor material achieved by placing metallic aluminum in contact with the wafer surface in a vacuum and permitting high temperature heat accelerated mixing and thus alloying migration to occur. The Goldstein et al. migrated alloy conductors are joined to "bonding pad" elements on both the frontal surface and the backside of the wafer.

Several aspects of the Goldstein et al. invention appear notable with respect to the present discussion; these aspects include for example the fact that the Goldstein et al. through-wafer conductor is not metallic in nature but is an alloy of semiconductor and metal materials. It is also of interest that the Goldstein et al. alloy conductor does not achieve an actual "via element" or a through-wafer annular path as would meet the normal configuration of a via element as is accepted in the electronic art and recited in applicants' invention. Additionally of interest is the temperature used in the Goldstein et al. process, the absence of a Goldstein et al. ground plane element and the fact that the Goldstein et al. invention is concerned with computer related semiconductor devices and computer signals rather than microwave radio frequency semiconductor devices and signals.

The absence of a metallic via conductor in the Goldstein et al. patent is significant in the present instance inter alia because of the undesirable electrical resistance presented by a non-metallic conductor. As inventor Dr. DeSalvo has suggested in the attached 37 C.F.R. 1.132 Declaration document the lowest possible milliohms of electrical resistance is desired in applicants' via elements in order to achieve satisfactory wafer front surface transmission line function and minimum transistor source electrode degeneration feedback; moreover metallic gold is desirably used to achieve this low resistance goal in view of its high electrical conductivity. Clearly the teaching of using a semiconductor and metal alloy material in the Goldstein et al. patent is in contradiction of applicants' invention and is thus fairly construed as a

teaching away from applicants' invention, a destruction of the function of applicants' invention and non-analogous art with respect to applicants' invention.

It is also notable that applicants' rejected claims (claims 1, 22, 30 and 31 for example) include recitations of via metal and of metal to ground plane metal contact at the wafer surfaces and that such contact is by definition not possible using the Goldstein et al. "alloy" material. In addition the 37 C.F.R. 1.132 Declaration by Dr. DeSalvo discusses both the achievable length of the Goldstein et al. alloy material element and the probable inability of the Goldstein et al. migration process being usable to achieve this length. These discussions especially raise significant questions as to the feasibility of achieving the needed alloy material element length in applicants' setting. These aspects of the Goldstein et al. patent thus appear to be reasonably construed as additional instances of destroying the function of applicants' invention if the teachings of the Goldstein et al. patent were adopted, indications of the non-analogous art nature of the Goldstein et al. patent with respect to applicants' invention and additional instances of teaching away from applicants' invention in the Goldstein et al. patent.

The 37 C.F.R. 1.132 Declaration of Dr. DeSalvo also discusses the temperatures used for accomplishing the Goldstein et al. migrated alloy conductor and predicts the certain destruction of the fabricated semiconductor device in applicants' invention if the temperatures recited in the Goldstein et al. patent were to be used in applicants instance. These aspects of the Goldstein et al. patent thus also appear to be reasonably construed as additional instances of destroying the function of applicants' invention if the teachings of the Goldstein et al. patent were adopted, indications of the non-analogous art nature of the Goldstein et al. patent with respect to applicants' invention and additional instances of teaching away from applicants' invention in the Goldstein et al. patent.

In extension of the discussion relating to the Morcom et al. patent, it appears significant to the present proceedings that the structure recited in the Goldstein et al. patent also lacks the ground plane element that is now recited in each of applicants' rejected claims. The absence of microwave radio frequency signals in the Goldstein et al. patent is again a possible explanation for this ground plane absence. Moreover with the absence of a ground plane element in both of the Morcom et al. and Goldstein et al. patents it appears that nothing in the references relied upon in the Office Action discloses the ground plane element that is recited in applicants' claims. Applicants' ground plane element is however clearly recited in the original application of the present proceedings, see for example the language of claim 22. This aspect of the Office Action rejection appears to be reasonably construed as a failure to consider all of the recited limitations in applicants' rejected claims, another of the court reasons to disfavor a 35 U.S.C. 103(a) rejection.

In addition to the distinctions between applicants invention and the combination of the Morcom et al. and Goldstein et al. references applicants submit there is no teaching in these references or in the application record to suggest making the asserted combination or modification of these references i.e., applicants find no teaching to combine or modify these patents. Such a teaching in support of an asserted combination has been found necessary by numerous court decisions in order to avoid the ever-present danger of using hindsight based on the teachings of an applicants' own invention as a motivation to accomplish an asserted 35 U.S.C. 103(a) combination. It appears especially unlikely that a person of ordinary skill in the electronic art would be motivated to both depart from applicants claim-recited metallic via conductor by combining a non-metallic via substitute with a wafer-strengthening patent.

Applicants additionally submit herewith a Declaration under the provisions of 37 C.F.R. 1.131 by the same Dr. Gregory DeSalvo relating to the secondary reference patent 6,358,762 of Kohno et al.; the patent relied upon in the Office Action for a showing of Inductively Coupled plasma (ICP) etching. As set forth in this Declaration and supported by copies of pages from a laboratory notebook maintained by Dr. DeSalvo, the issue date of the Kohno patent occurred after completion of the instant invention and also after the filing date of the instant application. In fact applicants' completion of the invention occurred prior to the United States filing date of the Kohno et al. patent. These date relationships are evidenced by the redacted laboratory notebook drawings and notes made by Dr. DeSalvo. For these reasons the Kohno reference is submitted to be ineffective or removed from consideration with respect to the present proceedings. The material from Dr. DeSalvo's notebook has herein been redacted with respect to dating in the interest of avoiding disclosure that could be significant in the event of a future Patent Interference proceeding or future litigation involving any patent issuing from the present application. A second Declaration under 37 C.F.R. 1.131 by applicants' undersigned attorney is included herewith in order to additionally corroborate the relationship of the redacted material dates with respect to the Kohno et al. patent dates.

The provisions of paragraph (D) in the Manual of Patent Examining Procedures section 715 topic "SITUATIONS WHERE 37 C.F.R. 1.131 AFFIDAVITS OR DECLARATIONS ARE INAPPROPRIATE" appear to suggest the instant 37 C.F.R. 1.131 Declaration documents are not necessary in these proceedings because a reference such as the Kohno et al. reference "is not used". Notwithstanding this statement and in view of the present in-fact second application of the Kohno et al. reference in rejection of applicants' claims by the Office Action, and also from an abundance of precaution viewpoint, applicants nevertheless herewith submit the two 37 C.F.R. 1.131 declarations inclusive of the substance material discussed above.

While on the subject of the Kohno et al. reference it also appears relevant that neither the Kohno et al. patent nor other of the presently relied upon references disclose the alternate form of etching recited in certain of applicants' rejected claims, i.e., the "Electron Cyclotron Resonance" (ECR) etching disclosed at page 7 of applicants' specification and recited in rejected claims 8, 29 and 35. The absence of an element clearly recited in applicants' claims in the relied upon references is submitted to comprise another instance in which the Office Action and the rejection fail to consider all the elements recited in the claims under rejection.

Applicants' rejected claims presently under consideration are claims of the method type. In view of this method claim nature, these claims are believed entitled to the benefit of the statutory interpretation axiom that a new use of old apparatus is nevertheless patentable as a method. Therefore even if the Examiner's Action asserted 35 USC 103a combination of elements could be fairly said to render apparatus claims relating to applicants' invention obvious within the meaning of 35 USC 103a (a conclusion of considerable question in this instance), the method claims under present rejection are nevertheless submitted to merit favorable consideration under the new use of old apparatus axiom. The language of the definitions in 35 U.S.C. 100(b) in fact appears to support this new use of old apparatus axiom.

Since the Yamada et al. and Matsunami references identified in the Office Action are employed in various combination with the Morcom et al., Goldstein et al. and Kohno et al. references, the difficulties identified herein with respect to the Morcom et al. and Goldstein et al. references are respectfully submitted to mitigate against the significance of these various Yamada et al. and Matsunami reference combinations and to preclude need for detailed consideration of the Yamada et al. and Matsunami patents herein.

Additionally the absence of a teaching to combine or modify references as recited above with respect to the Morcom et al. and Goldstein et al. patents also appears applicable to the Yamada et al. and Matsunami references and the various combinations using these patents.

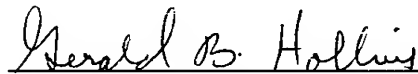
In view of the difficulties identified with respect to the Morcom et al., Goldstein et al. and Kohno et al. references, applicants respectfully submit that the foundation for the instant 35 U.S.C. 103(a) rejection of applicants' claims is significantly weaker than is appropriate for continuation of such a rejection. Reconsideration and withdrawal of the 35 U.S.C. 103(a) rejection is therefore respectfully solicited.

Applicants desire to acknowledge on the record the receipt of an earlier version of the October 20 Office Action, a document dated July 30, 2003, and an effort initiated by applicants' undersigned attorney to respond to this July 30 Office Action. The July 30 Office Action also included a 35 U.S.C. 112 rejection of applicants' claim 26 and a 35 U.S.C. 103(a) rejection of all claims in the application. This 35 U.S.C. 103(a) rejection was based on a combination of the present Morcom reference with the secondary references of U.S. Patent application publications 2003/0003724 of Uchiyama et al. and 2003/0119281 of Suzuki et al. both of which were filed after the January 3 2002 filing date of applicants' present application.

In view of the relatively late date of the Uchiyama et al. and Suzuki et al. References, applicants' undersigned attorney placed a telephone call to Examiner Maldonado in early October of 2003 seeking a better understanding of the July 30 Office Action. A second call of this nature was placed to Examiner Chaudhuri several days later, after being unsuccessful in reaching Examiner Maldonado; this second call was also uncompleted however a brief message of explanation of the call purpose was recorded on Examiner Chaudhuri's voice mail system. The present October 20 Office Action appears to be a response to these telephone calls. No conversation or "interview" in the normal sense of the word resulted from these telephone calls. In the absence of discussion relating to the July 30 Examiner's Action in the October 20 Office Action however applicants understand the later Office Action renders the earlier Office Action moot and without need for response. This moot status appears to be in agreement with the "vacated" status of the July 30 Office Action recited in the form PTOL 413 Interview Summary included with the October 20 Office Action.

In view of the changes to the application accomplished herein, the questions noted concerning the 35 U.S.C. 103(a) obviousness rejection and the attending remarks of explanation and argument the application is believed to now be in condition for allowance. Such allowance at the earliest possible date is respectfully solicited.

Respectfully submitted,



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